Faculty of Engineering & Technology
P.K.University
Shivpuri (MP)

**Evaluation Scheme & Syllabus for
Department Of Civil Engineering**

**M. Tech.-(Irrigation & Drainage)
(I to IV Semester)**

(Effective from session 2019-20)

EVALUATION SCHEME

M.TECH. IRRIGATION & DRAINAGE

Semester-I

SUBJECT CODE	SUBJECT NAME	THEORY		PRACTICAL		TOTAL
		SESS.(30)	EXT.(70)	SESS.(25)	EXT.(25)	
MT-ID-101	Advanced Engineering Mathematics	30	70	NA	NA	100
MT-ID-102	Ground Water Development & tube-wells	30	70	NA	NA	100
MT-ID-103	Soil –Water Plant relationship	30	70	25	25	150
MT-ID-104	Watershed Development & Managt	30	70	25	25	150
MT-ID-105	Research Institution/Industrial visit	NA	NA	25	25	50
MT-ID-106	Seminar-I	NA	NA	25	25	50

Semester-II

SUBJECT CODE	SUBJECT NAME	THEORY		PRACTICAL		TOTAL
		SESS.(30)	EXT.(70)	SESS.(25)	EXT.(25)	
MT-ID-201	Computer Programming	30	70	NA	NA	100
MT-ID-202	Applied Hydrology	30	70	NA	NA	100
MT-ID-203	Irrigation Management	30	70	25	25	150
MT-ID-204	Soil Salinity and Water Quality	30	70	NA	NA	100
MT-ID-205	Crop Environmental Engineering	30	70	NA	NA	100
MT-ID-206	Seminar-II	NA	NA	25	25	50

Semester-III

SUBJECT CODE	SUBJECT NAME	THEORY		PRACTICAL		TOTAL
		SESS.(30)	EXT.(70)	SESS.(25)	EXT.(25)	
MT-ID-301	Dissertation phase-I	NA	NA	200	300	600
MT-ID-302	Seminar-III	NA	NA	50	50	50

Semester-IV

SUBJECT CODE	SUBJECT NAME	THEORY		PRACTICAL		TOTAL
		SESS.(30)	EXT.(70)	SESS.(25)	EXT.(25)	
MT-ID-401	Dissertation phase-I	NA	NA	300	300	600

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I Year I Semester

MT-ID-101-Advanced Engineering Mathematics

(3-1-0)

Gamma, Beta and Legendre's functions, Euler's equations, Lang-range equations, the Ritz method, the Greens functions. Bolazane Weire-strass theorem in finite products.

Laplace transforms, Inverse Laplace Transforms and application to differential equations, Fourier series, Fourier transforms, Solution of non linear algebraic and transcendental equation by regula Falsi method.

Newton-Raphson Method. Newton forward and backward interpolation formula, divided differences. Trapezoidal Rule, Simpsons 1/3 rule,
Numerical solution of ordinary differential equations by Runge Kutta Method, Picards equations.

Books-

1. Michael Greenberg : Advanced Engineering Mathematics by persons publication.
2. B V Ramana: Higher Engineering Mathematics by core engg.
3. R K JAIN :advanced engineering mathematics book
4. C.B. Gupta S.R. Singh **:**Engineering Mathematics for Semester I and II by tata Mcra-hill publication.

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I Year I Semester

MT-ID-102 **Groundwater Development and Tube-wells 2(2-0-0)**

Occurrence, distribution and movement of ground water; Geological formations for ground water supply; Steady and unsteady flow in confined, unconfined and semi-confined aquifers; Groundwater fluctuations and recharge; Deriving aquifer characteristics from pumping tests; Groundwater survey and assessment of groundwater balances; Groundwater modeling, Groundwater contamination; Design, construction and maintenance of well and tube-wells; Development of wells; Selection of pumps and prime movers; well performance; Economics of Pumping.

Books-
   1. A.M. Michael, T.P. Ojha :Principles Of Agricultural Engineering Vol.-1 by jain brother publication.

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I Year I Semester

MT-ID-103 Soil-Water-Plant Relationship

3(2-0-1)

Soil water retention; Infiltration and water uptake; Measurement of soil water content; concept and measurement of soil water potential, Metric potential and Solute potential; Water exchange in plant cells and tissues; Water movement through the plant systems;

Concept and measurement of transpiration and Evapotranspiration; Energy and water balance; Factors affecting plant-water status, Metabolic and other characteristics for efficient water use; Availability of soil water for plant growth; Response of plant to water deficit; Effect of salinity on internal water deficit and plant growth.

Practical's –
1. To study and testing of Soil Physical Characteristics
2. To study and testing of Soil moisture
3. To study and testing of Evaporation,
4. To study and testing of Transpiration,
5. To study and testing of Evapotranspiration and plant water status.

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I Year I Semester

MT-ID-104 **Watershed Development and Management 3(2-0-1)**

Concept of watershed development and management; collection of hydrological data; watershed Characteristics and hydrologic cycle; problems of land degradation;

Land use capability classification and topographical characteristics of watershed; Appropriate soil and water conservation measures for agricultural and non-agricultural lands; Grassland development and management; Techniques for dry land farming based on watershed characteristics; water harvesting techniques for hilly and arid regions;

Hydrological and sediment monitoring of watershed; Estimation of peak design runoff rate;

Planning, management and economic evaluation of watershed development projects; case studies.

Practicals –
1. Data collection of Watershed
2. Analysis, planning and management of a given watershed
3. Field visit in watershed

MT-ID-105 Research Institution / Industrial Visit 1 (0-0-1)

I Year II Semester
MT-ID-201Computer Programming

3 (2-0-1)

Algorithms & Flow Charts, C programming: Preliminaries, Constants & Variables, Arithmetic Expressions,

Input- Output statements: Control Statements, Do-Statements, Subscripted variables, Elementary Format Specifications, Logical Statements & Decision Tables, Function & Subroutines

Computer Oriented Numerical Methods: Solution of Non Linear Equation, Bisection Method, Newton Method, Numerical Integration, Trapezoidal Method, Simpson's 1/3 & 3/8 rule .

Curve Fitting: Construction of forward, backward difference table, Interpolation Application of statistical packages

Books:-
1.Hopcroft & Ullman, "Introduction to Automata Theory, Languages, and Computation", Narosa Publishing House.
2.Aho, Hopcroft and Ullman, "Data Structures and Algorithms", Addison Wesley.
3.Dhamdhere, Öperating Systems", Tata McGraw Hill.
4.Aho, Ullman and Sethi, "Compiler Design", Addison Wesley.

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I Year II Semester

MT-ID-202- Applied Hydrology

2(2-0-0)

Basic hydrometeorology: Hydrologic cycle; Intensity-duration-frequency analysis of rainfall data.

Interpretation of precipitation data: Stream flow measurement; stage discharge relation; Interpretation of stream flow data; Run-off components and computations.

Hydrograph analysis; Characteristics, separation for simple and complex storms; unit hydrograph theory and its application; derivation of unit hydrograph, Shydro-graph and instantaneous hydrograph.

Flood estimation and routing; Stochastic process in hydrology; Hydrologic design of Engineering structures.

Books-

1. Dilip Kumar Majumdar Irrigations: Water Management: Principles And Practice By, PHI Publication.
2. MR Goyal:Micro Irrigation Management: Technological Advances and Their Applications by, CRC press.
3. Garg S. K. :Water Resources Engineering (Vol. I) by Khanna Publishers
4. Ven Chow , David Maidment :Applied Hydrology by Mcr-hill publication.

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I Year II Semester

MT-ID-203 Irrigation Management

3(2-0-1)

Water resource availability; Concept of crop water requirement; Direct and Indirect measurements / estimation of crop water requirement; Agrometrological station;

Irrigation requirements, Irrigation Scheduling using soil moisture status, Plant – water status and timing criteria; dynamic crop response model; Evapotranspiration models;

Selection of Irrigation methods in relation to soil, crop and water supply; Irrigation efficiencies; Field and project supply measurement flumes; crop water production function;

Economic analysis of on-farm irrigation using response functions of crops; Design of canal networks;

Energy utilization and management in Irrigation.

Books-
　　1. Irrigations Water Management: Principles And Practice By Dilip Kumar Majumdar , PHI Publication.
　　2. Micro Irrigation Management: Technological Advances and Their Applications by MR Goyal, CRC press.

Practical's –
1.To study about irrigation scheduling,
2. To find out Irrigation efficiencies.
3. To study and crop water requirements,
4. To study about flow measurements in water
5. Field visits.

MT-ID-204– Soil Salinity and Water Quality

2(2-0-0)

Scope and significance of salinity and sodi-city : Source and accumulation of soluble salts; Extent and distribution of salt affected soils.

Salinity and sodicity management; Soil salinity profiles; Plant response to salinity; Salt tolerance evaluation' Leaching and salinity control; Leaching requirement and methods.

Composition of irrigation water; Suitability of water for irrigation;

Salinity management techniques through irrigation; Waste water treatment and re-use for irrigation; Salt and water balance models.

Guidelines for inter-predation of water quality for irrigation.

MT-ID-205 Crop Environmental Engineering

2(2-0-0)

Environmental aspects of plant growth; Radiation and energy balance in plant canopies; Momentum transfer; Heat and Mass transfer of soil and plant environment; Partitioning of heat in dry and wet systems;

Micro-metrology of crops; evapotranspiration;

Photosynthesis; respiration and water use efficiency; Design and operation of controlled environment facilities;

Instrumentation and techniques for monitoring plant environment.